CLAIMS

1.   **(Currently Amended)** A computer implemented system, comprising:

a computing system having a decentralized operating system orchestrating services and resources represented as services executing on the computing system, the decentralized operating system comprising a process kernel and a distributing kernel;

the process kernel represents one or more services as processes, manages the processes, and facilitates the communication of one process with other processes for representing a resources including at least one of a device, content, an application or a user, , each service coupled to the a decentralized operating system [[is]] comprises an autonomous computation entity that exchanges one or more messages with a service coupled to a disparate decentralized operating system that resides in a different trust domain with a different security policy based in part on a protocol specified by the service;

a port associated with each service that is endued with one or more behavioral types that are specified by a unilateral contract, communication between services representing disparate resources is established based in part on compatibility between the one or more behavioral types associated with each service; and

the distributing kernel distributes computation for one or more services coupled to the distributing kernel decentralized operating system for orchestrating the services executing on the computer system so as to control and coordinate resources, such that the services representing the resource perform computations on a plurality of computers linked by a communication network;

wherein a memory coupled to a processor that retains the decentralized operating system.

2.   **(Currently Amended)** The computer system of Claim 1, wherein the computer system ~~includes~~ comprises: a microcomputer, a personal digital assistant, a cellular phone, or a display.

3.   **(Currently Amended)** The computer system of Claim 1, wherein the service comprises:

a communication primitive;

a behavioral primitive that comprises a unilateral contract; and

a designation primitive, wherein the designation primitive ~~includes~~ comprises a port identifiable by an identifier that includes a uniform resource identifier.

4.   **(Currently Amended)** The computer system of Claim 3, wherein the port is endued with a behavior type as specified by ~~a~~ the unilateral contract.

5.   **(Currently Amended)** The computer system of Claim ~~1~~ 3, wherein a unilateral contract of the behavioral primitive defines a protocol for exchanging messages in a particular order with a service to whom the unilateral contract belongs.

6.   **(Currently Amended)** The computer system of Claim 5, wherein the communication primitive ~~includes~~ comprises a set of message types usable in the messages exchanged among services so as to call a service to perform a certain task.

7.   **(Original)** The computer system of Claim 6, wherein the decentralized

operating system separates the control information from the data information in the messages when the messages are exchanged.

8.   **(Currently Amended)** The computer system of Claim 1, wherein <u>the autonomous computation entities comprise</u> ~~services include~~ services <u>representing one or more of: devices, content, applications, or people.</u>

9.   **(Currently Amended)** A computer implemented networked system for networking computer systems, comprising:

a first decentralized operating system executing on a computer system, which <u>comprises</u> ~~includes~~:

<u>a first process kernel representing a first set of resources as a first set of services;</u>

a first distributing kernel for designating uniform resource identifiers for ~~a~~ <u>the</u> first set of services and distributing messages among the first set of services, each service including a unilateral contract, the unilateral contract expressing behaviors of the service;

a second decentralized operating system executing on a disparate computer system coupled to the network, which <u>comprises</u> ~~includes~~:

<u>a second process kernel representing a second set of resources as a second set of services;</u>

a second distributing kernel for designating uniform resource identifiers for ~~a~~ <u>the</u> second set of services ~~and~~ distributing messages among the second set of services, each service including a unilateral contract, the unilateral contract expressing behaviors of the service, communication between the first and second set of services is established based

in part on compatibility determined between behavioral types specified by the unilateral contract associated with each service;

wherein a resource being represented as services from the second set of services is orchestrated by the first process kernel of the first ~~distributing~~ decentralized operating system, the services representing the resource perform computations on a plurality of computers linked by communication network; and

wherein a memory coupled to a processor ~~that~~ retains at least one of the first or the second decentralized operating system.

10. **(Currently Amended)** The networked system of Claim 9, wherein services ~~includes~~ comprise device drivers for devices.

11. **(Currently Amended)** The networked system of Claim 9, further comprising ~~a~~ the process kernel ~~for~~ communicating messages as processes among services.

12. **(Original)** The networked system of Claim ~~10~~ 11, further comprising an operating system kernel for managing memory, controlling devices, maintaining time and date, and allocating system resources.

13. **(Original)** The networked system of Claim 9, further comprising a network coupled to the first computer system, the network is selected from a group consisting of high bandwidth, low latency systems; high bandwidth, high latency systems; low bandwidth, high latency systems; and low bandwidth, low latency systems.

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14.   **(Cancelled)**

15.   **(Cancelled)**

16.   **(Previously Presented)** The networked system of Claim 13, wherein a service from the second set of services registers with the first distributing kernel to obtain a uniform resource identifier.

17.   **(Previously Presented)** The networked system of Claim 13, wherein the first distributing kernel distributes a message to a service from a first set of service, the message being sent by a service from a second set of services.

18.   **(Previously Presented)** The networked system of Claim 13, wherein the first decentralized operating system orchestrates a composition of a service from a first set of services and a service from a second set of services.

19.   **(Currently Amended)** A computer implemented system, comprising:

a decentralized operating system that <u>comprises:</u> ~~includes~~ a process kernel and a distributing kernel ~~comprising:~~,

<u>the process kernel represents a resource a one or more services, wherein a particular service is an autonomous computation entity that exchanges one or more</u>

messages with a disparate service that resides in a different trust domain with a different security policy based in part on a protocol specified by the service;

the distributing kernel comprising;

a URI (Uniform Resource Identifier) manager for managing names, each name constituting a unique designation of a service at the computer system so that the service can be discovered, ~~a resource is represented by multiple services, wherein the service is an autonomous computation entity that exchanges one or more messages with a disparate service that resides in a different trust domain with a different security policy based in part on a protocol specified by the service,~~ the multiple services perform computations on a plurality of computers linked by communication network; and

a message dispatcher for forwarding messages among services, each service being identifiable by a name managed by the URI manager, the each service ~~includes~~ comprises a port that is endued with one or more behavioral types that are specified by a unilateral contract, communication between the services is established based in part on compatibility between the one or more behavioral types associated with each service;

wherein a memory coupled to a processor ~~that~~ stores at least one of the URI manage or the message dispatcher.

20.   **(Original)** The computer system of Claim 19, wherein the distributing kernel further comprises a security manager for controlling authentication and authorization of rights and restrictions among services.

21. **(Original)** The computer system of Claim 19, wherein the distributing kernel further comprises a service loader for executing a sequence of instructions for loading components and services, the service loader being capable of dynamically loading or unloading services during the operation of the decentralized operating system.

22. **(Original)** The computer system of Claim 19, wherein the URI manager receives a register message from a service to obtain a unique designation and assigns the unique designation to the service, the URI manager being capable of receiving an unregister message for removing an assigned unique designation from a registry.

23. **(Original)** The computer system of Claim 19, wherein the message dispatcher forwards a message from a first service to a second service if the first service has a first uniform resource identifier assigned by the URI manager and the second service has a second uniform resource identifier assigned by the URI manager.

24. **(Currently Amended)** The computer system of Claim 19, wherein the message dispatcher ~~includes~~ comprises a message validity verifier for verifying that a message sent to the message dispatcher is a message whose structure complies with the SOAP protocol.

25. **(Original)** The computer system of Claim 19, further comprising a network manager for distributing messages forwarded by the message dispatcher to another computer system.

26.   **(Original)** The computer system of Claim 25, wherein the network manager comprises a serializer/deserializer, a transmission protocol processor, and a control/data plane separator.

27.   **(Currently Amended)** A method implemented on a computer system, comprising:

initializing a decentralized operating system on one or more computing systems, the decentralized operating system comprising a process kernel and a distributing kernel;

assigning a first unique name to a first service upon request, the first service represented as a process by the process kernel of a first computing system, the first service including a first unilateral contract for expressing the behaviors of the first service; and

distributing a message by the distributing kernel to the first service using the unique name, the message being sent by a second service having a second unique name, the second service including a second unilateral contract for expressing the behaviors of the second service, the second service resides in a different trust domain with a different security policy compared to the first service, communication between the first service and the second service via the message is established when the first unilateral contract is compatible with the second unilateral contract,

wherein the process kernel represents the first and second services represent as a respective resource.

28.   **(Original)** The method of Claim 27, further comprising loading a network manager and other services according to instructions written in a customizable, tag-based language.

29.   **(Original)** The method of Claim 28, further comprising spawning a service to listen for incoming messages for the first service that has been assigned the first unique name.

30.   **(Original)** The method of Claim 29, further comprising rejecting the message without distributing the message if a structure of the message fails to comply with a protocol for exchanging structured and type information of messages written in a customizable, tag-based language.

31.   **(Original)** The method of Claim 30, further comprising forwarding the message to the first service without routing the message through the network manager if the first service and the second service runs on a computer system.

32.   **(Original)** The method of Claim 30, further comprising forwarding the message to the first service by routing the message through the network manager if the first service runs on a first computer system whereas the second service runs on a second computer system.

33.   **(Original)** The method of Claim 32, wherein the act of forwarding including transmitting data information separately from transmitting control information.

34.   **(Currently Amended)** The method of Claim 33, wherein the act of transmitting ~~includes~~ <u>comprises</u> transmitting data information in accordance with transmitted

control information.

35.   (Currently Amended) A computer-readable medium having instructions thereon for implementing a method, the method comprising:

initializing a decentralized operating system on one or more computing systems, the decentralized operating system comprising a process kernel and a distributing kernel;

assigning a first unique name to a first service upon request, the first service represented as a process by the process kernel of a first computing system, the first service including a first unilateral contract for expressing the behaviors of the first service; and

distributing a message by the distributing kernel to the first service using the unique name, the message being sent by a second service having a second unique name, the second service including a second unilateral contract for expressing the behaviors of the second service, the message establishes communication between the first service and second service when the first unilateral contract is compatible with the second unilateral contract, the second service resides in a different trust domain with a different security policy compared to the first service, a resource is represented by multiple services.

36.   (Original) The computer-readable medium of Claim 35, further comprising loading a network manager and other services according to instructions written in a customizable, tag-based language.

37.   (Original) The computer-readable medium of Claim 36, further comprising spawning a service to listen for incoming messages for the first service that has been assigned the first unique name.

38.   (Original) The computer-readable medium of Claim 37, further comprising rejecting the message without distributing the message if a structure of the message fails to comply with a protocol for exchanging structured and type information of messages written in a customizable, tag-based language.

39.   (Original) The computer-readable medium of Claim 38, further comprising forwarding the message to the first service without routing the message through the network manager if the first service and the second service runs on a computer system.

40.   (Original) The computer-readable medium of Claim 38, further comprising forwarding the message to the first service by routing the message through the network manager if the first service runs on a first computer system whereas the second service runs on a second computer system.